

## Navy Issues Decision on Super Hornet Basing

*Department of the Navy Release*

The Department of the Navy issued a record of decision (ROD) for the basing of 10 F/A-18E/F Super Hornet strike-fighter squadrons and one fleet readiness squadron on the east coast of the United States.

The ROD details the plan to home base eight F/A-18E/F fleet squadrons and one fleet readiness squadron at Naval Air Station Oceana, Va., two F/A-18E/F fleet squadrons at Marine Corps Air Station Cherry Point, N.C., and construct an outlying landing field (OLF) in Washington County, N.C.

The need to construct and operate an OLF to support Super Hornet training, especially field carrier landing practice, was a key factor in the Navy's environmental analysis. Existing facilities do not have the capacity to meet Atlantic Fleet requirements when the Navy and Marine Corps are ordered to simultaneously surge-deploy multiple aircraft carriers and their associated air wings, which was the case during Operation Enduring Freedom and Iraqi Freedom. The Navy considered sites in North Carolina, South Carolina and Georgia.

The Washington County OLF site was recommended because it best fits the screening criteria the Navy used in considering candidate sites. These criteria included a low-population density and a lack of airspace conflicts and obstructions

(such as tall towers), as well as avoidance of extensive wetland complexes, public interest areas and ecologically sensitive areas. With its central location between MCAS Cherry Point and NAS Oceana, an OLF located in Washington County provides the greatest potential as a valuable training asset for current and future years.



*Graphics Courtesy of NAS Oceana*

Map shows location of projected East Coast Deployment of Super Hornet

### Look Inside For ...

Super Hornet Forward Fuselage	2
Myers Rides Super Hornet	2
Out and About	3
RAAF HUG Delivery	4
25th Anniversary Plans	4
Team Cuts Costs in Half	5
This 'n That	6

## ECP 6038 Helps Successfully Develop Super Hornet Forward Fuselage

*Nicolette Cormier*

Recognizing the need for continual improvements in affordability and performance for the Super Hornet, the U.S. Navy partnered with Boeing in February 2000 to significantly reduce the unit cost of the F/A-18E/F forward fuselage and begin the incorporation of six new avionics systems. Engineering Change Proposal (ECP) 6038 was developed to modify the existing multiyear production contract to develop a new forward fuselage with advanced manufacturing techniques that would significantly reduce the costs of integrating the Super Hornet's advanced mission systems.

The ECP 6038 forward fuselage team had three main goals: reduce forward fuselage unit cost; reduce the production cycle time from 34 months to 18 months; and reduce the number of quality defects by 90 percent.

"The challenges to the forward fuselage team were significant – we had to develop the new fuselage on a substantially smaller budget than any other similar development program," said Randy Allen, NAVAIR F/A-18E/F Air Vehicle IPT Lead.

"We had to ensure that the structural changes would have zero impact on critical interfaces with the aft fuselage, wings and landing gear. All structural affordability improvements had to be designed to a fatigue life that was 6,000 hours higher than the original design, but the weight of the fuselage was not allowed to increase. Also

we had to implement the changes into the aircraft full-rate production line without impacting the aircraft build cycle."

In order to achieve the program's goals, the Navy/Boeing team employed the latest in structural, subsystems, and product definition technologies.

"The design approach for the ECP 6038 fuselage was to replace multiple parts requiring labor intensive assembly with large unitized parts that required fewer assembly operations, fasteners, and drilling operations. For example, hundreds of sheet metal and machined parts that comprised the original crew station/fuel tank floor were replaced by two large complex aluminum machinings," said Allen.

The outcome of these efforts paid dividends. Structural certification was completed using advanced analytical techniques that enabled successful fatigue and static testing using only a single test article, compared to the industry standard of two test articles. Subsystem installation costs were reduced by a 15 percent parts count reduction even though six new avionics systems were being added to the aircraft.

Selective laser sintering was used to create complex ducting with integral attachments and without tooling. Labor-intensive sealing operations were significantly reduced through application of new technology grommets and gaskets. Unitized electrical bundle "trays" were used to significantly reduce the number of

individual wire bundle clamps and provide more positive restraint of these critical components.

"One of the unique aspects of the program was the team's development of an integrated process and computing infrastructure to fully define the new fuselage entirely by three-dimensional, computer solid models," said Allen.

"No drawings were used to produce the new forward fuselage. Product definition data for detail parts was electronically delivered to Boeing's external suppliers who fabricate and sub-assemble structural and subsystem components. A virtual reality simulation was used at various steps to review the production assembly steps, and our Navy reliability team was able to use the system to verify that maintenance requirements were met."

The new forward fuselage has successfully completed structural and subsystem certification testing; full rate production has begun; flight-testing began August 2003 and is expected to complete in November 2003. The Navy has evaluated the ECP 6038 program's technical performance as "exceptional" for the past two years.

"The ECP forward fuselage program has met or exceeded nearly every goal. The ECP 6038 Forward Fuselage development program has demonstrated the ability to deploy innovative, advanced technologies in an affordable, timely, and well-executed manner," said Allen.



## Joint Chiefs of Staff Chairman Rides Aboard Super Hornet



A Navy pilot helps Air Force Gen. Richard B. Myers, chairman of the Joint Chiefs of Staff, hook in before a familiarization ride aboard a Navy F/A-18F. Photo by Jim Garamone.

# Out and About With The Fleet



Atlantic Ocean (Oct. 16, 2003) – An F/A-18C Hornet assigned to the “Knighthawks” of Strike Fighter Squadron VFA-136 flies over the flight deck of USS *George Washington* (CVN 73) as it prepares for the Tailored Ships' Training Availability exercise. U.S. Navy photo by Photographer's Mate Airman Joan Kretschmer.

An F/A-18E Hornet assigned to the “Warhawks” of Strike Fighter Squadron VFA-97, patrols the skies during flight operations on USS *Nimitz* (CVN 68) in the Pacific Ocean. The *Nimitz* Carrier Strike Group and her embarked Carrier Air Wing Eleven (CVW-11) are deployed to the western Pacific. U.S. Navy photo by Photographer's Mate 3rd Class Elizabeth Thompson.



Atlantic Ocean (Sept. 24, 2003) – An F/A-18 Hornet assigned to the “Sidewinders” of Strike Fighter Squadron VFA-86 is “spotted” onto one of four steam driven catapults on the flight deck of USS *Enterprise* (CVN 65). The *Enterprise* is underway participating in a Comprehensive Training Unit Exercise (COMPTUEX) in preparation for a Mediterranean deployment. U.S. Navy photo by Photographer's Mate 3rd Class Lance H. Mayhew Jr.

# RAAF Takes Delivery of Final Hornet Upgrade



Air Marshal Angus Houston, AO, AFC Chief of Air Force, sits in a HUG 2.1 upgraded F/A-18 Hornet. Looking on are Air Vice Marshall John Monaghan, Head Aerospace Systems Division; Rear Admiral James B. Godwin III, U.S. Navy Program Executive Officer for Tactical Aircraft programs; Anthony M. Parasida, Boeing Vice President - F/A-18 Hornet Integrated Defense Systems (2nd from the left), and associated dignitaries look on. Photo by RAAF LAC Clint Siggins.

*Nicolette Cormier*

The Royal Australian Air Force (RAAF) recently accepted delivery of the last of 71 F/A-18 Hornet aircraft, which were modified under a Hornet Upgrade (HUG) program.

The first of a two-part upgrade, Phase I provided a seven-year continuous improvement program that consisted of significant enhancements to communication and identification systems. The upgrades included the addition of a sixth multiplexed bus (MUX), upgrades to mission computer hardware and software, as well as replacement of the inertial navigation system.

RAAF Chief Air Vice-Marshal

Angus Houston was on hand for the ceremony at Base Williamtown, New South Wales, and took delivery of the Hornets, saying the modifications had proved their value to the coalition during "Operation Iraqi Freedom" (OIF). The RAAF Hornets flew in excess of 350 combat sorties over Iraq, totaling approximately 1800 hours during Operation Falconer. Houston said the new radars and other electronic systems meant RAAF Hornets flying over Iraq could bomb targets as well as provide air defense to high value American aircraft, all in the same operation.

Representing NAVAIR at the ceremony, Rear Adm. James B. Godwin III, Program Executive Officer for Tactical Aircraft programs, commented to the audience, "The

magnitude of the HUG program is perhaps the most significant upgrade of an F/A-18 by any service in the world. Its success was proven during 'Operation Iraqi Freedom.' "

Phase 2 of the HUG program is now in progress, and is expected to be completed by 2007. Phase 2.1, which replaced the existing radar with the new AN/APG-73, is now complete. Phase 2.2, now underway, consists of avionic upgrades to the ALE-47, and the addition of the Joint Helmet Mounted Cueing System, the Advanced Memory Unit and the Multifunction Information Display System.

The RAAF F/A-18 Hornets are based at Williamtown, New South Wales, and Tindal, Northern Territory.



NAVAIR will hold a celebration to commemorate the 25<sup>th</sup> Anniversary of the first flight of the F/A-18 aircraft on November 20. To commemorate the day, industry representatives will fill the atrium of the Moffett Building with displays and hands-on interactive simulations. PMA265 will hold a special ceremony in the afternoon that will bring back former employees from the Navy and industry as well as the first person to fly the aircraft, former Boeing Test Pilot, Mr. Jack Krings. All persons are welcome to attend.





# Production Line Shut Down Team Cut Costs in Half

*Nicolette Cormier*

The NAVAIR F/A-18 Program recently expressed gratitude and recognition to the Boeing Company in appreciation for their support during the Navy's F/A-18A/B/C/D production line tooling transition and shut down effort that took place May 1999-September 2003.

The NAVAIR award was in recognition of Boeing's cost effective disposition of the tools, which were transitioned to various locations during the production line shutdown. Tools that had an immediate requirement were transferred to other requiring contracts, or were shipped to depot activities for utilization. Tools, which had no immediate requirement, were shipped to Granite City, Illinois for preservation for potential future use.

The Boeing production line transition (PLT) team's dedication to cost savings made the transition affordable and attainable. The process used for disposition of the F/A-18A/B/C/D Special Tooling and Special Test Equipment (ST & STE) was streamlined and tailored for volume and speed of disposition, versus the standard government procedure. While processing the shut down, Boeing provided inventory and utilization data to AMA Technologies to populate the Electronic Tooling Information Management System (eTIMS) database. This database gives the Navy inventory and operational data on the approximately 85,000 pieces of ST & STE developed for the manufacture and support of the A-D aircraft.

"In 1998 we realized that, with the last 'D' model slated to come off the production line in 2000, we would have to put into effect a strong tooling transition program," said Pat Behel, NAVAIR F/A-18A/B/C/D Air Vehicle IPT Lead. "At the time, we were faced with a huge bill. As the PLT team worked more closely



*Photo courtesy of the Boeing Company*

The Boeing production line transition team celebrates the Navy's F/A-18A/B/C/D production line tooling transition and shut down effort.

together, we were able to cut that bill in half due to a lot of innovative ideas. In the beginning, Boeing had a challenging task ahead of them. There were over 200 sub vendors in the United States, Australia, Great Britain, Europe and Canada - they did a tremendous job. There was healthy collaboration going on between NAVAIR, NAVICP, NATEC, and Boeing and its vendors to make this tooling disposition work."

The bulk of the production line transition effort centered on physically accounting for, locating, and shipping the tools. Once that was accomplished, arrangements had to be made for the tools to be easily accessible. The team recognized the reutilization of production tooling would benefit the F/A-18 community for many years.

"What eTIMS does is give an inventory of tools that allows you to ascertain where every tool is," said Phil Hamilton, NAVAIR F/A-18A/B/C/D PLT leader. "It also has part-to-tool and tool-to-tool information. This gives information on what tool is needed to work with a particular part. In order to acquire a tool, a request is made to the

NAVICP tool manager who utilizes eTIMS to locate the tool.

Behel explained, "There's a lot of value in the data base beside tool access. In a case where there are two requirements for a particular tool, eTIMS has a hyperlink to the NATEC PLT database facilitating access to drawings that give directions to manufacture and set up the tool."

First on the agenda during production line shutdown/transition was to identify all of the tooling used to build the airplane. This included all the special tooling, special test equipment, test articles and drawings. Boeing went into their property records and gathered all pertinent data. Boeing and Government PLT Team members frequently went on site to inspect tools to ascertain the requirement to retain them, and, if more than one duplicate of a tool existed, to identify which was in the best condition. The company also had to give the government the data for part-to-tool information in a format that would upload into eTIMS. Boeing literally had to go back 25 years to the days when everything was

*Cont. on page 6*



**An F/A-18** assigned to NAVAIR at NAWS China Lake, California, recently completed the first test flight of the APG-79 Active Electronically Scanned Array (AESA) radar developed by Raytheon Space and Airborne Systems. The test flight lasted for two hours and was conducted at the beginning of the radar's validation and verification phase.

**The Dambusters** of VFA-195, along with 10 of the squadron's F/A-18C Hornets, 20 other Hornets from the Golden Dragons of VFA-193 and the Royal Maces of VFA-27 arrived at Anderson Air Force Base, Guam, Sept 5, from their home base of

Atsugi, Japan. The F/A-18 will take part in the Strike Fighter Advanced Readiness Program.

**The Secretary of the Navy** and the Chief of Naval Operations recognized NAVAIR Test and Evaluation Squadron (VX) 23 for their key effort to support and sustain our operational forces during the recent conflicts. The squadron was awarded the Navy's Meritorious Unit Commendation for their excellence in aircraft research, development, test and evaluation during the period of August 2000 to October 2002. The test squadron completed 465 highly critical test projects for the F/A-18E/F, the Joint Strike Fighter, X-31, EA-6B, and T-45 aircraft, while surpassing 42,000 mishap-free flight hours.

### ***Line Shutdown cont. from page 5***

on paper, and convert the data to eTIMS-compatible format and forward it to AMA Technology, the F/A-18 eTIMS vendor. The result of this intensive research is a database that gives a good description of tool-to-tool and part-to-tool relationships.

Both Behel and Hamilton believe the Center Barrel Program is a good example of how the program has paid off: The people who went out to assess the tools had the foresight to look at the center barrel tools and realize the tool may be needed in the future. At the present time, North Island and Jacksonville are installing the Center Barrels and have the tooling available.

Tooling disposition has, and is saving the U.S. Government money in many ways. Alan Martin, NAVICP tooling manager, calculates and puts out a cost point chart monthly that

shows how much money the government saves each month with this program.

The PLT Team believes the program has been an all-encompassing success, saving the U.S. Government millions of dollars as well as building a database that properly accounts for, and relocates, the tools.

"Unfortunately, the technology to implement a program like eTIMS was not around 25 years ago," said Behel. "The key thing now is the transfer of knowledge to other efforts such as the E/F and the AV-8B programs. We are sharing this knowledge and lessons learned with those programs to help them with the task that lies ahead.

"The F/A-18A/B/C/D tooling disposition was a huge challenge and we commend Boeing for a job well done, and are pleased to recognize the PLT team with this award." Behel said.

